

# Planned Contrasts for ANOVAs in R

PSY 652 Module 11

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# What are planned contrasts and why are they useful?

- Examine pairwise differences between groups
- Pre-planned analyses reduce the need to correct for multiple comparisons
- Conduct planned contrast tests *after* running the initial ANOVA

# Step 1: Create your contrasts

```
contrast1<-c(-2,1,1)
```

```
contrast2<-c(0,-1,1)
```

- Assigns a weight to each of the groups in your predictor variable
  - Weights should add up to zero
  - Assigning a weight of zero means that group will not be included in the contrast
  - Order corresponds to order of groups in predictor variable

# Step 2: Attach contrasts to your predictor variable

```
contrasts(viagraData$dose)<-cbind(contrast1, contrast2)
```

```
viagraData$dose
```

```
[1] Placebo    Placebo    Placebo    Placebo    Placebo    Low Dose    Low  
Dose    Low Dose    Low Dose    Low Dose    High Dose    High Dose    High Dose  
[14] High Dose    High Dose  
attr(,"contrasts")
```

	contrast1	contrast2
Placebo	-2	0
Low Dose	1	-1
High Dose	1	1

Levels: Placebo Low Dose High Dose

# View the variable to confirm that weights were properly assigned

# Step 3: Run the ANOVA with contrasts

```
viagraPlanned<-aov(libido ~ dose, data = viagraData)
```

# The contrasts were attached to the predictor variable in the previous step

```
summary.lm(viagraPlanned)
```

# The summary.lm function allows you to access the contrasts

# Step 3: Run the ANOVA with contrasts

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	3.4667	0.3621	9.574	5.72e-07	***
dose1	0.6333	0.2560	2.474	0.0293	*
dose2	0.9000	0.4435	2.029	0.0652	.

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.402 on 12 degrees of freedom

Multiple R-squared: 0.4604, Adjusted R-squared: 0.3704

F-statistic: 5.119 on 2 and 12 DF, p-value: 0.02469

NOTE:  $p$  values in planned contrasts are one-tailed, so divide by two in your interpretation

Intercept = grand mean of the outcome variable

Estimates = difference between the grand mean and the mean for the group weighted with a positive value (1 in this case)

$p$  values = significance level of t-test for the contrast

# References

The code examples in this presentation are from:

Field, A, Miles, J. & Field, Z. (2012). Discovering statistics using R. Los Angeles, CA: Sage Publications.